REPORT NO. 710/38

4th REPORT - COMPOSITE PLATE

C15 to C18.

USE OF SPECIALLY HARDENED FRONT PLATES

by

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1st. Lt., Ord. Dept.

1934

Report No. 710/28
Watertown Arsenal

September 18, 1934

4th Report - Composite Plate
C15 to C18
Use of Specially Hardened Front Plates

This report covers tests of four composite plates, C 15 - C 18. Pieces of 1/4" and 1/8" homogeneous plate were quenched and drawn to give Brinell hardnesses from 444 to 555.

The object of these tests was to try harder plates on the front of the combination used in composite plate covered in 1st Report 710/14. It was felt that, if the front plate could be made to spall without cracking, the area of the spalled button would present a larger surface for energy absorption in the back plates.

Though spalling was obtained the resistance of plates C 15, 16 and 17 was not as good as that obtained when standard 418 Brinell plate was used on the front of the combination, as shown in above-mentioned report. It is believed, however, that the principle enunciated is sound and that further experiments of this nature should be made.

Plate C-18 was tested in an attempt to use harder 1/8" plate on the front of the combination. The results were entirely unsuccessful. It is apparent from this and other tests made with 1/8" plate of 418 Brinell hardness

(Report 710/-14) that a heavier plate is necessary as the front plate of the combination. If heavier plate is not used in front, insufficient energy is taken from the bullet core to allow the soft inner materials to be of any value. Further use of 1/8" plates on the front of such combinations is not recommended.

Respectfully submitted:

D. J. Martin,
1st.Lt., Ord. Dept.

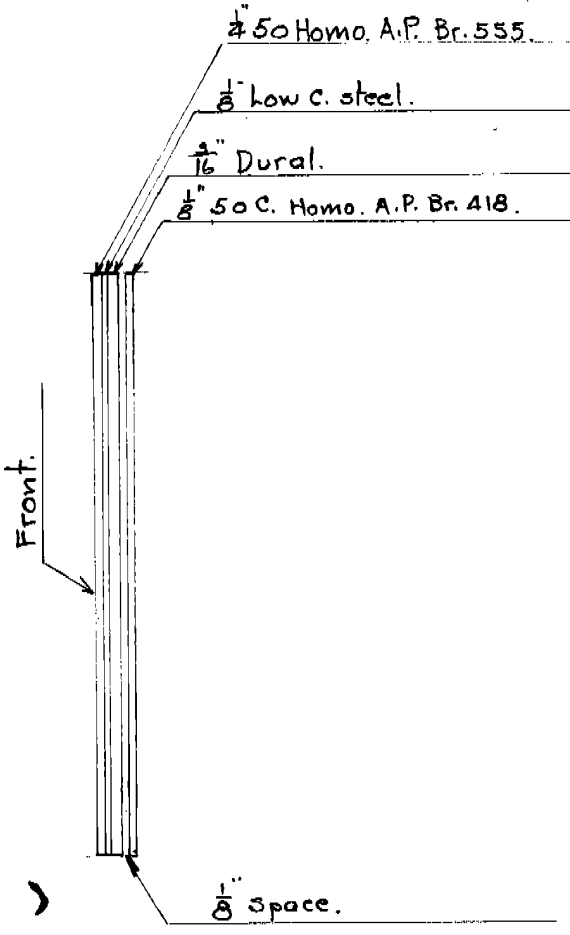


PLATE NO. C - 15

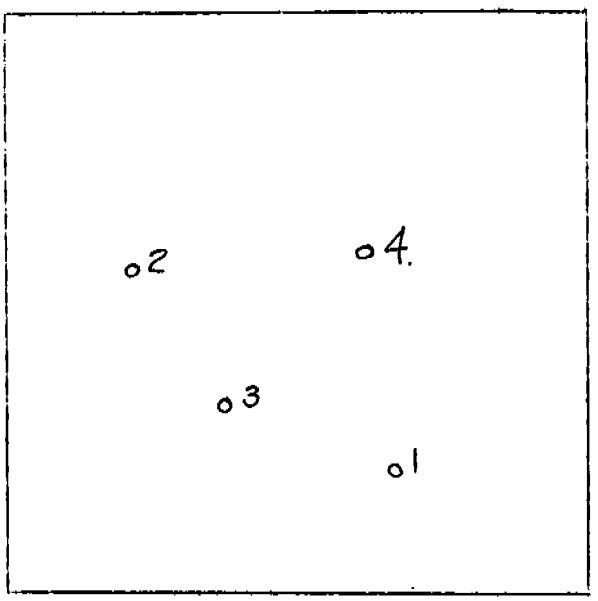
DATE Aug. 30, 1934

Plates rolled by Henry Disston & Sons Co. and Heat treated at Watertown Arsenal, to Brinell hardness required. The cores showed a slight tipping in the plate, as they started through the second plate, i.e. the 3/16" Dural sheet.
Quench in oil 1600°F

Drawn to 340°F 2 hrs. Brinell 555
On rds 2- 3 and 4 cores slightly tipped.

ARMOR PLATE COMPOSITION

C.	Mn.	P.	S.	Si.	Cr.	Mo.	Va.
.45/.55	.40/.60	<.03	<.03	.15/.25	1.10/1.30	.60/.80	.20/.30



ROUND NO.	STRIKING VELOCITY	REMARKS
1	Service	C.I.P. Slight bulge
2	"	C.I.P. Slight spalled bulge and comp. penetration
3	"	C.I.P.Slight spall and bulge
4	"	Same as #2 comp.penet.

PLATE NORMAL, 100 YD. RANGE, .30 CAL. M1922 A.P. BULLETS, MANN BARREL UNLESS NOTED OTHERWISE.

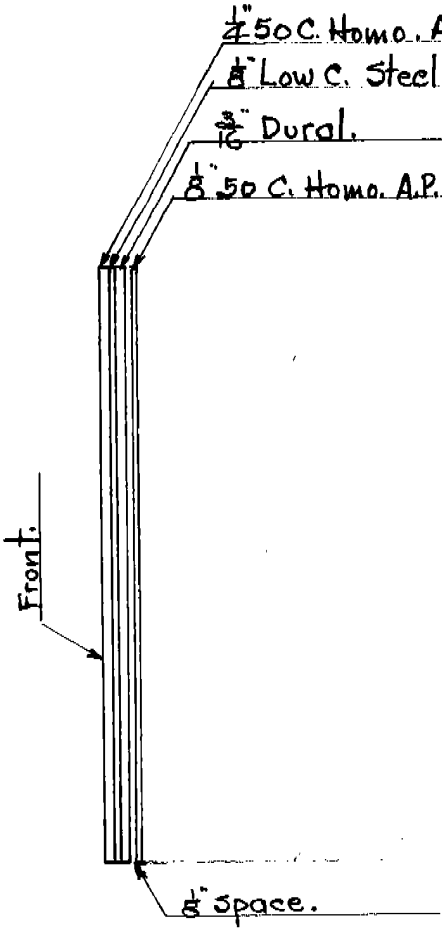


PLATE NO. C - 16

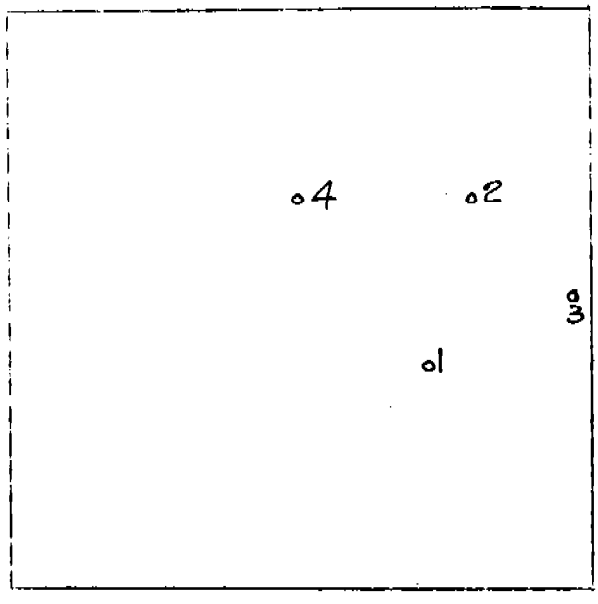
DATE Aug. 30, 1934

Plates were rolled by Henry Diaston & Sons Co. and heat treated at Watertown Arsenal, to Brinell hardness required. Quenched in oil at 1600°F drawn at 525°F 2 hrs. Brinell 477.

The cores made bulges on the back plate with slight cracks permitting daylight to show through.

ARMOR PLATE COMPOSITION

C.	Mn.	P.	S.	Si.	Cr.	Mo.	Va.
.45/.55	.40/.60	<.03	<.03	.15/.25	1.10/1.30	.60/.80	.20/.30



ROUND NO.	STRIKING VELOCITY	REMARKS
1	Service	C.I.P. comp. penet.
2	"	C.I.P. slight bulge
3	"	On edge
4	"	Comp. penet. C.I.P.

PLATE NORMAL, 100 YD. RANGE, .30 CAL. M1922 A.P. BULLETS, MANN BARREL UNLESS NOTED OTHERWISE.

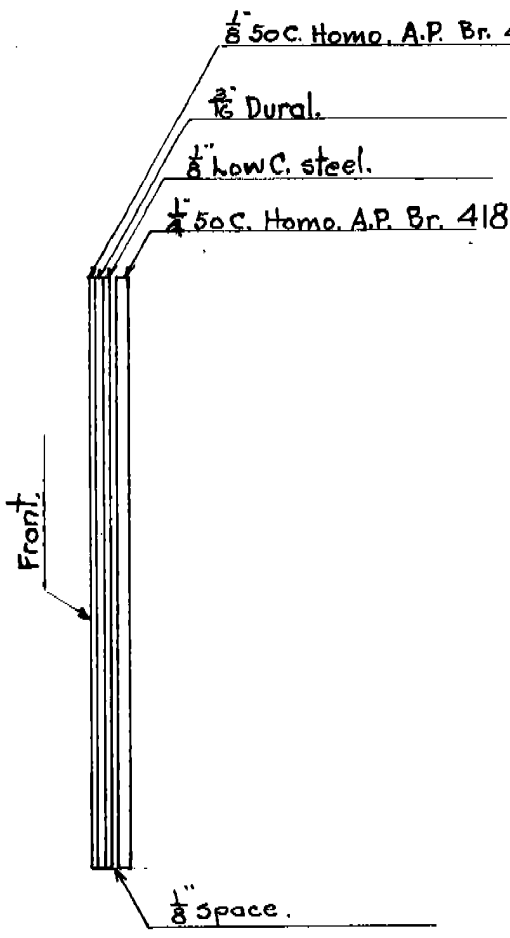


PLATE NO. C - 17

DATE Aug. 30, 1934

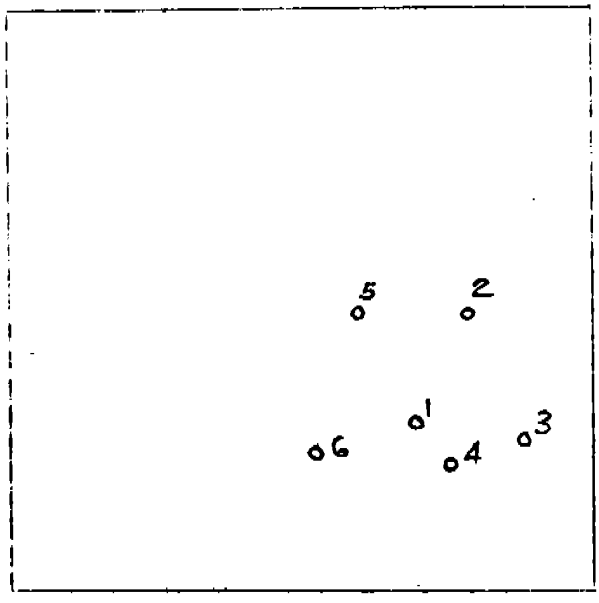
Plates were rolled by Henry Disston & Sons Co. and heat treated at Watertown Arsenal, to Brinell hardness required.

Quenched in oil at 1600°F drawn at 750° 2 hrs. Brinell 444.

The cores made bulges on the back plate with slight cracks permitting daylight to show through.

ARMOR PLATE COMPOSITION

C.	Mn.	P.	S.	Si.	Cr.	Mo.	Va.
.45/.55	.40/.60	<.03	<.03	.15/.25	1.10/1.30	.60/.80	.20/.30



ROUND NO.	STRIKING VELOCITY	REMARKS
1	Service	C.I.P. comp. penet.
2	"	" "
3	"	C.I.P. comp. penet. plate spalled.

PLATE NORMAL, 100 YD. RANGE, .30 CAL. M1922 A.P. BULLETS, MANN BARREL UNLESS NOTED OTHERWISE.

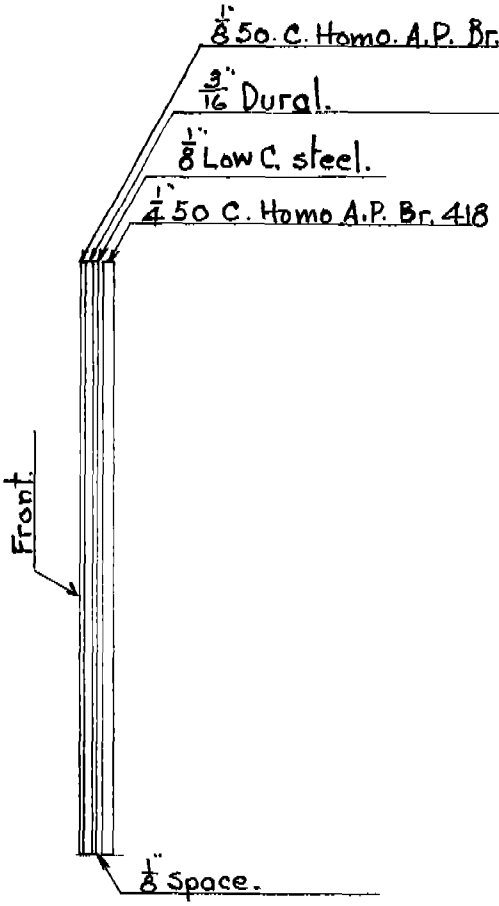


PLATE NO. C - 18

DATE Aug. 30, 1934

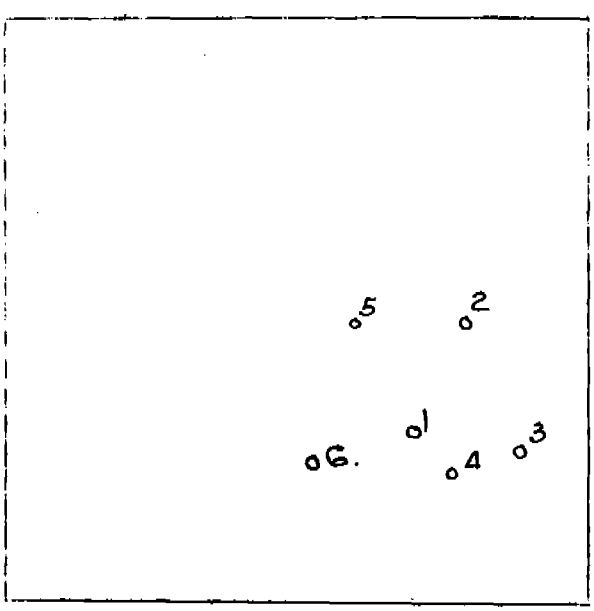
Plates were rolled by Henry Disston & Sons Co. and heat treated at Watertown Arsenal to Brinell hardness required.

Quenched in oil at 1600°F drawn at 750°F 2 hrs. Brinell 444.

1/8" plate on front was hardened for 444 Brinell, did not work as well as with 1/4" plate on front.

ARMOR PLATE COMPOSITION

C.	Mn.	P.	S.	Si.	Cr.	Mo.	Va.
.45/.55	.40/.60	<.03	<.03	.15/.25	1.10/1.30	.60/.80	.20/.30



ROUND NO.	STRIKING VELOCITY	REMARKS
	2488	1/2/3 - No good. Core about all the way through.
		4/5/6 - Almost as bad - cores struck through back plate.

PLATE NORMAL, 100 YD. RANGE, .30 CAL. M1922 A.P. BULLETS, MANN BARREL UNLESS NOTED OTHERWISE.

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